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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/567,427	02/06/2006	Rudolf Rigler	2923-747	8429

6449 7590 08/30/2010
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EXAMINER	
ELEY, JESSICA L	
ART UNIT	**PAPER NUMBER**
2884	

NOTIFICATION DATE	DELIVERY MODE
08/30/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTO-PAT-Email@rfem.com

Office Action Summary	Application No.	Applicant(s)	
	10/567,427	RIGLER ET AL.	
	Examiner	Art Unit	
	JESSICA L. ELEY	2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 17 June 2010.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 7 and 9-17 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 7 and 9-17 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

In regards to claim 7 as amended, Applicant argues (page 9) that Stern may disclose some limited form of "processing" that is integrated with the chip but fails disclose any evaluation means integrated in the sensor chip. In the cited passage (¶0083) Stern teaches that the first and second accumulator processing can be performed "on-chip." Additionally in ¶0082 Stern teaches that functions such as thersholding, binning, edge detection and readout out intensity data can be performed in the secondary frame storage section **370** which Stern teaches is located on-chip to take advantage of faster processing time and lower power requirements (¶0081).

In Regards to claim 12, Applicant argues that the disclosure in Stern of a cross-correlation technique (¶0040) does not teach the location of the cross-correlation being integrated in the sensor chip. The Examiner respectfully disagrees. While it is true in ¶0040 Stern does not disclose exactly where the cross-correlation will take place, Stern does teach that the secondary frame storage section which performs such important functions as thersholding, binning, edge detection and reading out intensity data of only pixel regions that are of interest also teaches that "more sophisticated signal processing can be performed directly in the secondary storage section," (¶0082). Given the signal processing functions already disclosed by this element and the fact that Stern teaches the advantage of performing these functions on chip as opposed to off-chip (¶0081), it would be obvious to one of ordinary skill in the art to perform the cross-correlation taught by Stern in ¶0040 in the

secondary frame storage section in order to take advantage of the faster processing time and the lower power consumption (¶0081).

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. **Claims 7, 9, 11, 12, 13, 14 and 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoyt US 2001/0033374 A1 (*Hoyt*), Stern et al. US 2005/0012033 A1 (*Stern*) and Modlin et al. US 6,071,748 (*Modlin*).

Regarding **claims 7 and 12**, Hoyt teaches a device for determining luminescent molecules by means of optical excitation in confocal measuring volumes (FIG. 6), comprising:

A carrier arrangement (plate **33**) for holding a sample that contains molecules (illuminate sample **50**) to be determined,

An optical excitation device for providing multiple light beams and, in particular, comprising

at least one light source **30**,

at least one passive or active diffractive optical element **40** for splitting penetrating light into multiple beam, and

a focusing optics **36** for focusing penetrating multiple light beams into the sample elements in the respective measuring volume for the purpose of exciting luminescence in the multiple elements,

An optical detection device **55** for detecting luminescence for the confocal volume elements, for capturing emitted radiation from the multiple confocal volume elements, and

Signal processing and evaluation means for processing the signals provided by the detector (FIG. 7).

Hoyt does not go into detail about the detector element **55**, instead leaving it to one of ordinary skill in the art to pursue the known options in the art. Stern teaches an imager for use in the field of bio-fluorescence (¶0014). The detector taught by Stern comprises a spatially resolving sensor matrix of avalanche photodiodes that is produced using IC technology, in particular CMOS technology, and is integrated in a sensor chip with Geiger mode wiring (¶0117). Furthermore Stern teaches the signal processing (accumulators, ¶0083) and evaluation means (secondary frame store **370** responsible for thersholding, binning, edge detection, ¶0081-0082) are integrated in the sensor chip (¶0083). It would be obvious to one of ordinary skill in the art at the time the invention was made to use the imager taught by Stern in the system taught by Hoyt since Stern teaches that this imager outperforms with respect to low-light sensitivity and high speed applications requiring real-time continuous data acquisition and signal processing (¶0117).

Hoyt does not specifically teach the samples being confocal volume elements. However such sample containers are well known in the art. Modlin teaches a fluorescence detector that uses confocal volume optics and elements to analyze the sample (C13 L14-31). It would be obvious to one of ordinary skill in the art at the time the invention was made that the technology taught by Hoyt as applied to a sample **50** contained in a microtiter plate **33** can be applied to the confocal volume elements taught by Modlin when the need exists for analyzing the wells in the microtiter plate **33** with anticipated success.

Regarding **claim 9**, the disclosures of Hoyt, Stern, and Modlin address all the limitations of parent claim 7, further the teachings of Stern teach the detector in which the signal processing and evaluation means comprises at least one cross-correlation function of first or higher correlation orders of measuring signals (¶0040).

Regarding **claim 11**, Hoyt teaches a device for determining luminescent molecules by means of optical excitation in confocal measuring volumes (FIG. 6), comprising:

A carrier arrangement (plate **33**) for holding a sample that contains molecules (illuminate sample **50**) to be determined,

An optical excitation device for providing multiple light beams and, in particular, comprising

at least one light source **30**,

at least one passive or active diffractive optical element **40** for splitting penetrating light into multiple beam, and

a focusing optics **36** for focusing penetrating multiple light beams into the sample elements in the respective measuring volume for the purpose of exciting luminescence in the multiple elements,

An optical detection device **55** for detecting luminescence for the confocal volume elements, for capturing emitted radiation from the multiple confocal volume elements, and

Signal processing and evaluation means for processing the signals provided by the detector (FIG. 7).

Hoyt does not go into detail about the detector element **55**, instead leaving it to one of ordinary skill in the art to pursue the known options in the art. Stern teaches an imager for use in the field of bio-fluorescence (¶0014). The detector taught by Stern comprises a spatially resolving sensor matrix of avalanche photodiodes that is produced using IC technology, in particular CMOS technology, and is integrated in a sensor chip with Geiger mode wiring (¶0117). It would be obvious to one of ordinary skill in the art at the time the invention was made to use the imager taught by Stern in the system taught by Hoyt since

Stern teaches that this imager outperforms with respect to low-light sensitivity and high speed applications requiring real-time continuous data acquisition and signal processing (¶0117). Further the teachings of Stern show the signal processing and evaluation means are integrated in the sensor chip (¶0083). Further the teachings of Stern teach the detector in which the signal processing and evaluation means comprises at least one cross-correlation function of first or higher correlation orders of measuring signals (¶0040).

Hoyt does not specifically teach the samples being confocal volume elements. However such sample containers are well known in the art. Modlin teaches a fluorescence detector that uses confocal volume optics and elements to analyze the sample (C13 L14-31). It would be obvious to one of ordinary skill in the art at the time the invention was made that the technology taught by Hoyt as applied to a sample **50** contained in a microtiter plate **33** can be applied to the confocal volume elements taught by Modlin when the need exists for analyzing the wells in the microtiter plate **33** with anticipated success.

Regarding claims **13, 14 and 16**, the disclosures of Hoyt, Stern, and Modlin address all the limitations of parent claims 9, 11, and 12 respectfully. Furthermore Stern teaches the correlation function enabled for cross-correlation (¶0040). When Stern is used as the imaging array in the fluorescence assay system taught by Hoyt, as argued in the obvious combination above, the imaging array will need to detect the plurality of fluorescent bands generated by the fluorescent system in order to distinguish between the different fluorescent labels. One skilled in the art wishing to implement the obvious combination of the Stern and Hoyt would require Stern to be sensitive to a plurality of fluorescent bands and thus multiple wavelengths of luminescence. Since Stern teaches the advantages of cross-correlation of successive frames in an image, it would be obvious to one skilled in the

art at the time the invention was made that the cross-correlation technique taught by Stern would be applied to two or more wavelengths of the detected luminescence.

5. **Claims 10, 15 and 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoyt US 2001/0033374 A1 (*Hoyt*), Stern et al. US 2005/0012033 A1 (*Stern*) and Modlin et al. US 6,071,748 (*Modlin*), and further in view of Silver US 6,078,681 (*Silver*).

Regarding claims 10, 15 and 17 the disclosures of Hoyt, Stern, and Modlin address all the limitations of parent claims 7, 11, and 12 respectfully. Hoyt, Stern, and Modlin do not directly teach the signal processing and evaluation means comprising circuits for carrying out a fast Fourier transform of the measuring signals. However, such a step is very common in the art as evidenced by Silver. Silver teaches an imaging system that uses fast Fourier transform as an analysis tool (column 12 lines 50-54). It would be obvious to one of ordinary skill in the art at the time the invention was made to use a fast Fourier transform of the measuring signal since Silver teaches that standard software exists for analysis of multichannel image data (column 12 lines 49-56), which the image data from Hoyt, Stern, and Modlin is.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JESSICA L. ELEY whose telephone number is (571)272-9793. The examiner can normally be reached on Monday - Thursday 8:00-6:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David P. Porta/
Supervisory Patent Examiner, Art Unit 2884

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